



5 Technical Note



Exhibit Case Construction Materials

5:8 Interior Paints for Exhibit Cases



The selection of paints used in exhibit cases is an important conservation decision because of the high level of **emissions** produced by most commercial paints. Systems based on water-based acrylic resins with zero or low VOC **emission** rates are recommended.

Why are paints a conservation concern?

A paint system generally consists of a solution composed of pigments, a binding medium and a solvent (or vehicle). In the past, paints have been selected with little scrutiny as to their contents and possible effect upon materials being displayed within the case. Today, any solvent-based paint used in close proximity to exhibit objects is considered problematic due to the harmful effects of volatile organic compounds (VOCs) given off by these coatings. Objects are not safe unless a low (or zero) VOC product is chosen. Direct contact with any painted surfaces is not recommended due to the possible transfer of components and the **acidic nature** of many paint systems.

- VOCs are substances that contain carbon and evaporate readily.¹ VOCs that are harmful to objects include aromatic hydrocarbons, such as benzene and toluene, and chlorinated hydrocarbons, such as methylene chloride.² The interaction of sunlight with emitted VOCs can form ground level ozone.
- The measurement of the coating's VOC level is a good way to determine whether the paint is safe to use in an exhibit case. A low or zero VOC content is desirable, and is measured in "grams of VOCs per unit volume.
- The U.S. Environmental Protection Agency regulates levels of VOC emissions in paints.⁴ Paint labels display the "grams of VOCs per liter."⁵ A rule of thumb is the stronger the smell of paint fumes, or the higher the gloss level, the higher the VOC content.

Low VOC Paint Levels	Metric	English
Non-flat paint.....	0 - 150 g/l	0 - 1.25 lbs/gal
Flat paint.....	0 - 50 g/l	0 - 0.42 lbs/gal



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What paints can be recommended for use inside exhibit cases?

There are some general considerations to follow in choosing a paint.

- Solvents and additives: Avoid paints with aromatic hydrocarbons, some of the most damaging VOCs. Research and inquire about other additives which may be present in paint such as mold retardants.
- Resin type: Oil and alkyd-based binders in paints are not appropriate for use inside an exhibit case. Latex paint is more breathable, has better color and mildew resistance, and expands and contracts with wood more easily than an alkyd paint.
- Barrier effectiveness: Neither alkyd nor latex paint creates an effective vapor barrier coating for wood products. Their film is permeable to wood offgassing and formaldehyde emissions. Use latex paint over a specifically formulated [barrier coating](#), foil or laminate.

Acrylic latex paints (emulsions) are dispersions of pigments in a liquid continuous phase of water and an acrylic resin, prepared by emulsion polymerization. Latex water-based paints with acrylic binders are essentially solvent free and are therefore among the safer paints for use within cases. Latex paints are variable, however, and may contain ammonia, sulfur or other undesirable chemicals. Selection and application of a paint should include the following considerations.

- 100% acrylic latex paint has proven successful in meeting restrictive conservation criteria.
- Paint loaded with calcium carbonate offers some benefits when acidic materials are a particular concern.
- Paint loaded with titanium dioxide will absorb UV light.
- Remove objects from the painting area during application.
- Never place objects inside the case until the paint is thoroughly dry to the touch and a curing time of at least three weeks has elapsed.
- Be aware that water-based acrylic latex paint can become tacky during periods of high humidity; isolate collection objects from painted surfaces.
- Although they do not provide a barrier to volatile emissions from the wood, shellac and other air-drying lacquers are acceptable clear coatings. Some plastics and resins or gasket and caulk products may react with the alcohol in shellac.

The commercial paints in the following table meet the "Green Seal" standard for VOC levels and prohibited ingredients.³



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Zero or Low VOC Recommended Paints		
MANUFACTURER	PRODUCT NAME	VOC LEVEL G/L
Benjamin Moore	Pristine Flat	26
Benjamin Moore	Pristine® Eggshell	23
Benjamin Moore	Pristine Semi-Gloss	18
Con-Lux	Enviro-plex Flat White	0
Duran	Genesis™ Flat	0
Duran	Genesis™ Semi-Gloss	0
Duran	Genesis™ Gloss	0
ICI Dulux Paints	Lifemaster™ 2000 Eggshell	0
ICI Dulux Paints	Lifemaster™ 2000 Semi-Gloss	0
ICI Dulux Paints	Lifemaster™ 2000 Flat	0
PPG	Speedhide Wall Flat	19
PPG	Speedhide Enamel Eggshell	25
PPG	Speedhide Enamel Semi-Gloss	14
Sherwin Williams	ProMar 200 B3 I W200 Series Semi-Gloss	37
Sherwin Williams	HealthSpec™ B5 Series Flat	0
Sherwin Williams	ProMar 200 B30 W200 Series Flat	19
United Point Mfg.	Aladintone Satin	41
United Point Mfg.	Pointers Choice Eggshell	46
United Point Mfg.	Parade Flat	12
United Point Mfg.	Coverall Flat	14
Primer Paints		
Benjamin Moore	Fresh Start Exterior Primer	31
ICI Dulux Paints	Lifemaster 2000 Interior Primer	0
PPG	Speedhide Sealer	41
Sherwin Williams	PrepRite B28 W300	50
Sherwin Williams	PrepRite 200 B28 W200	26
Sherwin Williams	HealthSpec B11 W44	0
Sherwin Williams	PrepRite Anchor-Bond B51 W50	18
United Point Mfg.	Adhere-it (WB) Primer-Sealer	44
United Point Mfg.	Acrysheen Primer-Sealer	34
United Point Mfg.	Canyontone Water Base Primer-Sealer	39
VOC - Volatile Organic Compound. Rating is by G/L - grams per liter of product minus water. All VOC level information was provided by the manufacturers.		



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Products, Manufacturers, and Suppliers

Mention of a product, manufacturer, or supplier by name in this publication is for information only and does not constitute an endorsement of that product or supplier by the National Park Service. Listed materials have been used successfully in past applications. It is suggested that readers also seek alternate product and vendor information to assess the full range of available supplies and equipment.

Manufacturers of Low-VOC Emitting Paints

Pristine Series

Benjamin Moore
800-826-2623
Distributor; CT Walls
Charles Town, WV
Telephone: 304-725-1461

Enviro-Plex Series

Con-Lux Coatings, Inc.
Box 847 Talmadge Road
Edison, NJ 08818

Genesis Series

Duron Paints and Wallcoverings
10406 Tucker Street
Beltsville, MD 20705
Telephone: 800-723-8766
Web: Duron.sales.com

Safecoat Paint (not tested)

Earth Friendly Products, AFM Enterprises
Alternative Energy Engineering, Inc.
P.O. Box 339
Redway, CA 95560

Lifemaster Series

ICI Dulux Paints
925 Euclid Avenue
Cleveland, OH 44145
Telephone: 800 984 5444
Distributor; 3711 MacCorkle Ave., SE
Charleston, WV 25304
Telephone: 304-925-4955

Speedhide Series

PPG
Telephone: 888 774 1010
Distributor: Duron Paints and Wallcoverings
5807 Highway 85
Frederick, MD
Telephone: 304-728-8722

ProMar and HealthSpec Series

Sherwin Williams
Telephone: 216 566 2151
Fax: 800-474-3794
Distributor; 10 Jefferson Crossing
Charles Town, WV 25414
Telephone: 304-728-8722



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Aladintone, Pointers Choice, Parade, Coverall Series
United Paint Mfg. Co.
Telephone: 800-541-4383

Green Seal Inc.
1001 Connecticut Avenue, NW, Suite 827
Washington, D.C. 20036
Telephone: 202-872-6400
Fax: 202-872-4324
e-mail: karen.banks@greenseal.org

- 2. Organizations Focusing on Paint VOCs**
U.S. Environmental Protection Agency (EPA)
Research Triangle Park
Raleigh, North Carolina 27711 Telephone:
919-541-5408

- ¹ For specific VOCs, consult the U.S. Environmental Protection Agency (EPA) Code of Federal Regulations (CAR) Title 40, Part 60 Appendix A.
- ² Carbon dioxide, nitrogen oxides and sulfur dioxides are not VOCs but are also emitted into the atmosphere. Either alone or in association with VOCs, they contribute to a range of current or potential atmospheric pollution effects, like ozone depletion, the greenhouse effect, and acid rain.
- ³ Recommended VOC levels, Green Seal Inc. Green Seal Newsletter August-September, 1998 (www.greenseal.org)
- ⁴ Section 59.402 of the Federal Register. VOC contents are tested by the EPA's Reference Method 24.
- ⁵ The specific definition is "grams per liter excluding water or exempt compounds, thinned to the maximum thinning recommended by the manufacturer," Vol. 61, No. 171, September 1996, Proposed Rules of the Federal Register.

This Technical Note was written by Conservators Toby Raphael and Nancy Davis as part of the Exhibit Conservation Guidelines a technical resource created by the National Park Service, produced by the Division of Conservation, Harpers Ferry Center. For more information see www.nps.gov/hfc/conservation/exhibit. Future Technical Notes will be developed on various exhibition and conservation subjects; your comments and suggestions are welcome. Contact hfc_conservation@nps.gov.